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## Museum of Comparative Zoology

US ISSN 0006-9698

CAMBRIDGE, MASS. 3 FEBRUARY 2015 NUMBER 542


# A CATALOGUE OF THE TYPE SPECIMENS OF YPONOMEUTOIDEA (LEPIDOPTERA) IN THE MUSEUM OF COMPARATIVE ZOOLOGY WITH REVISED STATUS OF *PLUTELOPTERA OCHRELLA*


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ABSTRACT. This catalogue includes a total of 31 species of Yponomeutoidea for which all or a part of type series have been deposited in the collection of the Museum of Comparative Zoology, Harvard University: 10 Argyresthiidae, eight Lyonetiidae, seven Ypsolophidae, two Yponomeutidae, two Plutellidae, one Heliodinidae, and one whose systematic position remains uncertain. Of these, the primary type specimens of Yponomeutoidea comprise six holotypes, 11 lectotypes, and one species described from syntypes. All primary and secondary type specimens of Yponomeutoidea from the collection are catalogued with annotations of their original citations, collecting data, specimen condition, current taxonomic status, and if necessary, notes on uncertainty involving the type series. Lectotypes are designated for 12 species from the collection of the Museum of Comparative Zoology, including eight argyresthiids (*Argyresthia altissimella* Chambers, 1877; *Argyresthia austerella* Zeller, 1873; *Argyresthia belangerella* Chambers, 1875; *Argyresthia montella* Chambers, 1877; *Argyresthia pedmontella* Chambers, 1877; *Argyresthia quercicolella* Chambers, 1877; *Bucculatrix thuiella* Packard, 1871; *Argyresthia undulatella* Chambers, 1874) and four confirmed or putative lyonetiids (*Cemiostoma albella* Chambers, 1871; *Eurynome albella* Chambers, 1877; *Lyonetia alniella* Chambers, 1875; *Acanthocnemes fuscoscapulella* Chambers, 1878), and for eight species from the collection of the Natural History Museum, London, including one argyresthiid (*Argyresthia deletella* Zeller, 1873), six ypsolophids (*Cerostoma canariella* Walsingham, 1881; *Enceratia castella* Walsingham, 1881; *Cerostoma dentiferella* Walsingham, 1881; *Cerostoma falciferella* Walsingham, 1881; *Cerostoma frustella* Walsingham, 1881; *Enceratia securella* Walsingham, 1881), and one plutellid (*Plutella vanella* Walsingham, 1881). The taxonomic identity of *Pluteloptera ochrella* Chambers, 1880, once a junior synonym of *Ypsolopha ustella* (Clerck, 1759), is revised with examination of the genitalia, which suggests that the species needs to be resurrected as a senior synonym of *Cerostoma rubrella* Dyar, 1902.



KEY WORDS: Ditrysia; Lepidoptera; nomenclature; taxonomy; type specimens; Yponomeutoidea; Ypsolophidae



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## INTRODUCTION

Type specimens serve as the anchor for species-level names and validity of name-bearing taxa (Winston, 1999). Unambiguous definition of any species is, therefore, strongly


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dependent on information from the type specimen. Early workers in insect taxonomy did not realize the value of type specimens, so they often did not designate types. In such cases, tracing the specimens used for the original descriptions can be extremely difficult. The Microlepidoptera described by V. T. Chambers are examples of this practice. In his descriptions, he seldom gave details of the type specimens. His types have therefore been traced using his descriptions and specimen labels. These efforts were often challenged because his descriptions and label data were inadequate or ambiguous. It becomes further complicated by the fact that his types were sometimes dispersed among several institutions without documentation.

Most of Chambers' specimens, if traceable, can be found in the Museum of Comparative Zoology (MCZ), Harvard University, Cambridge, Massachusetts. These include holotypes and a portion of the syntypes (cotypes auct) designated by Chambers during 1876 to 1883 (Hagen, 1884). These specimens had not been properly curated and cataloged until Miller and Hodges (1990) inventoried the Chambers' type specimens for all 609 microlepidopteran species from the MCZ collection. Their results are now available in an online database (Perkins, 2010).

Miller and Hodges (1990) listed the type specimens of 33 yponomeutoid species from the MCZ collection, scattered among Tineoidea, Copromorphoidea, and Yponomeutoidea in their catalog. The list comprises four holotypes, one lectotype, one paralectotype, and syntypes for 28 species. The foundation of the type specimens was established by Chambers, who described 19 yponomeutoid species from Kentucky, Colorado, and Texas of the United States and Canada. For at least three species, syntypes have been dispersed to several institutions, as indicated in Miller and Hodges (1990).

Another set of yponomeutoid types consists of nine species from California and Oregon, U.S.A., described by Walsingham (1881). These are a part of the syntypes sent to Chambers as gifts (Miller and Hodges, 1990). For the nine species, one syntype for each, often mistakenly labeled as holotype, was deposited in the Natural History Museum, London, and other syntypes were sent to colleagues, correspondents, and collections, especially in North America. Other works that contributed type specimens to the MCZ collection include Zeller (4 spp. described from Dallas, Texas, from 1872 and 1873), Kearfott (1903; syntypes of *Zelleria celastrusella*), and Packard (1871; syntypes of *Bucculatrix thuiella*). Historical details of the MCZ collection can be found in Hagen (1884) and Miller and Hodges (1990).

Several ambiguities involved in the microlepidopteran type specimens from the MCZ collection were clarified by Miller and Hodges (1990). The type designations for some yponomeutoids, however, remain unclear. Furthermore, Miller and Hodges (1990) arranged the yponomeutoids according to an outdated classification. The aim of this paper is to provide a complete list of yponomeutoid type specimens with annotations of their type status, collection data, and current taxonomic identity, to clarify any uncertainty involved in the original descriptions and the type depositions, to designate lectotypes as necessary, and to revise the taxonomic status of *Pluteloptera ochrella*.

## METHOD AND CONVENTIONS

The specimens considered in this catalog are the type specimens of Yponomeutoidea deposited in the MCZ. The type specimens were identified primarily by type labels which are the red, rectangular papers written "Type" or "M.C.Z. Type" with numbers (Figs. 1a, b), or the rectangular papers with

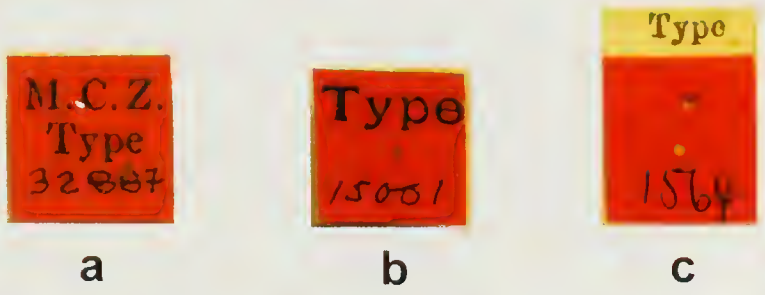



Figure 1. Three representative type label formats (a–c) from the MCZ.

white area and letter "Type" on top of a red area with numbers (Fig. 1c). The type label data were compared with the original descriptions to assure that the specimens are the true types. Uncertainties involved in the type status were clarified, if possible, according to ICZN (1999). When the original descriptions did not clearly indicate the nature of the type series, any extant type specimen for the species was regarded as syntype (ICZN, 1999: Article 73.2). As necessary, lectotypes were designated with a specimen among the syntypes that is in good condition and consistent with the original description.

The type specimens of *Pluteloptera ochrella* and *Cerostoma rubrella* and non-type specimens of *Ypsolopha ustella* were dissected for comparison, following Clarke (1941), except that chlorozal black was used as a stain. The terms for genital morphology follow Klots (1970). The dissected genitalia were examined using a Leica MZ APO stereoscope and then slide-mounted in Euparal resin. The prepared slide specimens were examined using a Leica LEITZ-DMRX compound microscope for the detailed structures of the genitalia. Adult specimens and their labels were photographed using a Nikon D30 digital camera. Images of genitalia were prepared using the VDBK digital imaging systems, installed in the Department of Entomology, the U.S. National Museum of Natural History, Washington, D.C.

The species included in this catalog are arranged in alphabetical order of the specific names. Each account includes the reference in which the species was described and the original generic combination, followed by the type locality, the type status with verbatim label data (label contents in the quotation marks; '/' for line breaks), and the current taxonomic status with family assignment in brackets. The label data with special marks, including single or double strike-through, are mentioned in brackets. Additional label data given by the present author are shown in brackets. The classification of Yponomeutoidea follows Sohn *et al.* (2013). The specimen data are followed by the notes, if necessary, to clarify any uncertainty involved in the original descriptions.

Abbreviations for the specimen depositories other than MCZ include:

AMNH—American Museum of Natural History, New York, U.S.A.

ANSP—Academy of Natural Sciences, Philadelphia, Pennsylvania, U.S.A.

BMNH—Natural History Museum, London, U.K.

EMEC—Essig Museum of Entomology, University of California, Berkeley, California, U.S.A.

LACM—Natural History Museum of Los Angeles County, Los Angeles, California, U.S.A.

USNM—United States National Museum of Natural History, Washington, D.C., U.S.A.

Other abbreviations include:

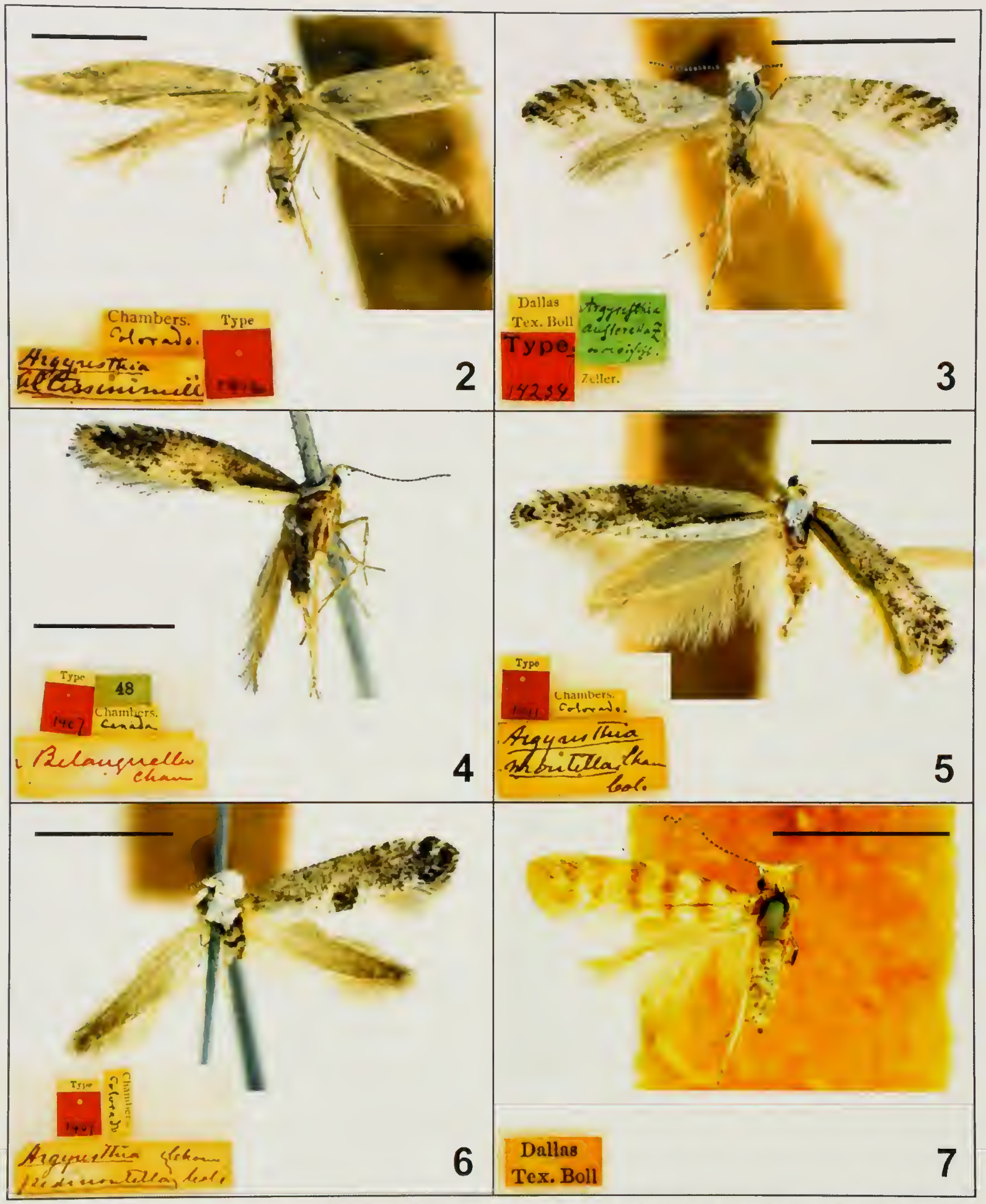
Co.—county

ex.—"exemplar" for the specimen whose sex cannot be determined

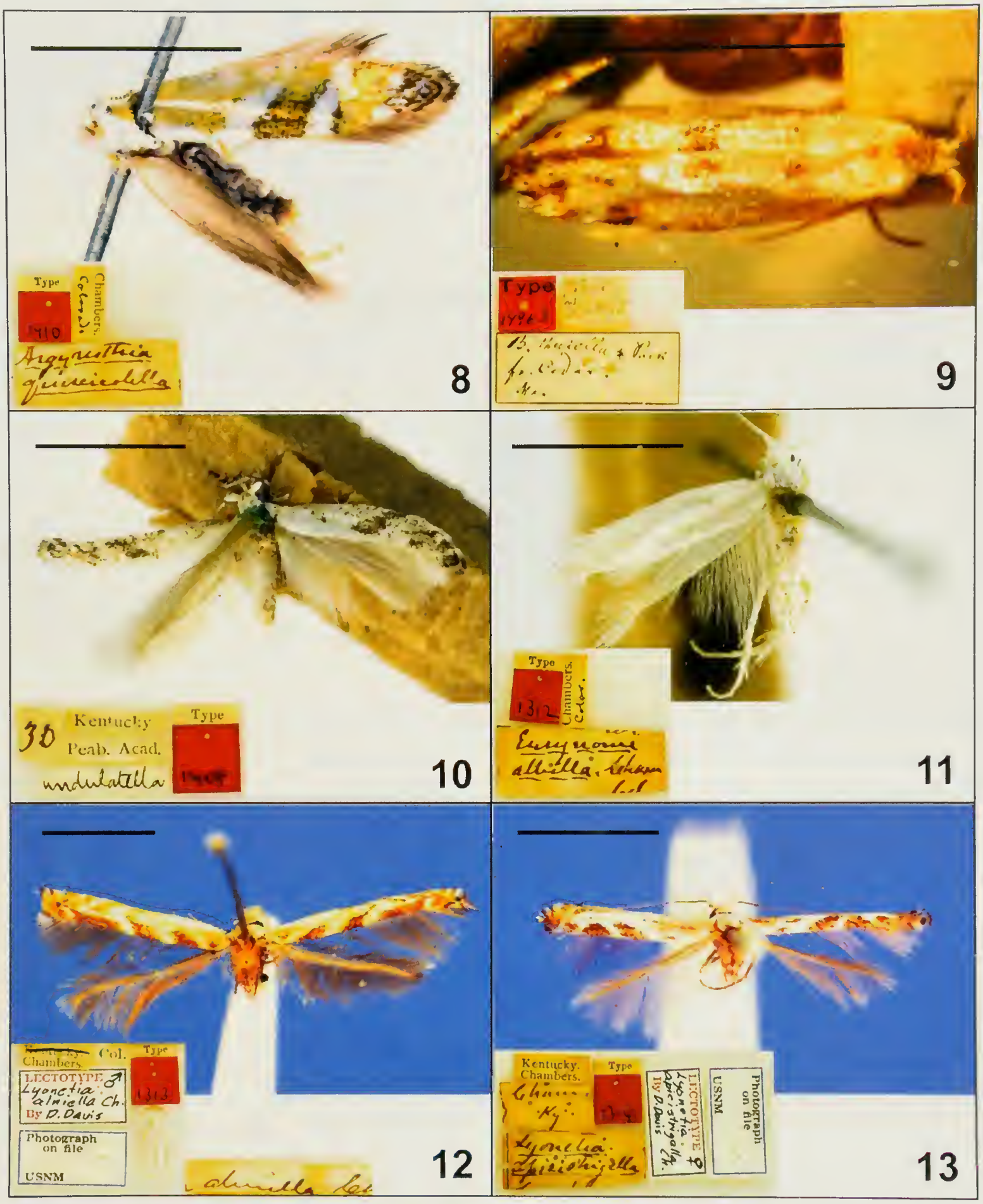
Mt.—mountain

## LIST OF THE TYPE SPECIMENS

***abroniaecella*** Chambers, 1876: 217 (*Lithariapteryx*).




Figures 2–7. Type specimens and labels of Yponomeutoidea from the MCZ collection (scale bars = 3 mm). 2. *Argyresthia altissimella* Chambers, lectotype. 3. *Argyresthis austerella* Zeller, lectotype. 4. *Argyresthia belangerella* Chambers, lectotype. 5. *Argyresthia montella* Chambers, lectotype. 6. *Argyresthia pedmontella* Chambers, lectotype. 7. *Argyresthia quadristrigella* Zeller, holotype.




Figures 8–13. Type specimens and labels of Yponomeutoidea from the MCZ collection (scale bars = 3 mm). 8. *Argyresthia quercicolella* Chambers, lectotype. 9. *Argyresthia thuiella* (Packard), lectotype. 10. *Argyresthia undulatella* Chambers, lectotype. 11. *Philonome albella* (Chambers), lectotype. 12. *Lyonetia alniella* Chambers, lectotype. 13. *Lyonetia apicistrigella* Chambers, lectotype.

Figures 14–18. Type specimens of Yponomeutoidea from the MCZ and USNM collections (green scale bar = 1.5 mm; black scale bars = 3 mm). 14. *Acanthocnemes fuscoscapulella* Chambers, lectotype, MCZ. 15. *Philonome luteella* (Chambers), holotype, MCZ. 16. *Lithariapteryx abroniaeella* Chambers, lectotype, MCZ. 17. *Ypsolopha ochrella* (Chambers), holotype, MCZ. 18. *Ypsolopha rubrella* (Dyar), lectotype, USNM.

Figures 19–26. Adults of *Ypsolopha ochrella* (19–22) and *Y. ustella* (23–26) (scale bars = 2 mm). 19. Utah, U.S.A., female, USNM. 20. Texas, U.S.A., female, EMEC. 21. Arizona, U.S.A., male, USNM. 22. Texas, U.S.A., male, USNM. 23. Piedmont, Italy, male, USNM. 24. Oldenburg, Germany, male, USNM. 25. Hersfeld-Rotenburg, Germany, male, USNM. 26. Lüneburg, Germany, female, USNM.

*Type Locality.* Edgerton, Colorado, U.S.A.

*Type Series (designated by Powell, 1991).* Lectotype (Fig. 16)—♂, "Chambers Color[ado]", "Type/ 1565" [red label with white top], "*Lithariapteryx /abroniaeella/* Cham. Col." [handwritten on folded paper], "LECTOTYPE [in red]/ *Lithariapteryx/ abroniaeella* Chamb./ By JAP '74" [label with black line borders], "♂", "Genitalia 3840 JAP '74" [handwritten on label with black line borders]. Paralectotypes—2♂, 5♀, 1 ex., Colorado, [no date].

*Current Status. Lithariapteryx abroniaeella* Chambers, 1876 [Heliodinidae].

***albella*** Chambers, 1871: 23 (*Cemiostoma*).

*Type Locality.* Kentucky, U.S.A.

*Type Series (designated here).* Paralectotypes—1♂, 1 ex., Kentucky, [no date], Chambers.

*Current Status. Paraleucoptera albella* (Chambers, 1871) [Lyonetiidae].

*Notes.* Sohn and Lewis (2012) stated the type status of *Cemiostoma albella* as holotype. This is not correct because Chambers (1871) stated at least five specimens in his description of *C. albella* and did not specify the type series. The holotype (male) in the USNM collection, mentioned in Sohn and Lewis (2012), is here designated as the lectotype of *C. albella*. The labels read: "Type/ No. 518/ U.S.N.M." [red label], "9) *Cemiostoma/ albella/* Chs. Cham" [handwritten].

***albella*** Chambers, 1877: 140 (*Eurynome*).

Figures 27–34. Genitalia of *Ypsolopha ochrella* (27, 28, 30, 31, 33) and *Y. ustella* (29, 32, 34). 27. Female, holotype of *Pluteloptera ochrella* Chambers. 28. Female, paralectotype of *Cerostoma rubrella* Dyar. 29. Female genitalia of *Y. ustella*. 30. Antrum variations of *Y. ochrella* (a: holotype of *Pluteloptera ochrella*; b: paralectotype of *Cerostoma rubrella*; c: Utah, USNM 115035; d: Texas, USNM 115053; e: Arizona, USNM 115054; f: Texas, EMEC-JCS 028; g: Texas, USNM 115037; h: half-folded, Oregon, USNM 115038; i: Texas, USNM 115055; j: Arizona, USNM 115056). 31–32. Phallus. 33–34. Male genital capsule.

*Type Locality.* near Edgerton, Colorado, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 11)—♀, "Chambers/ Color[ado]", "Type/ 1312" [red label with white top], "*Eurynome/ albella* Cham" [handwritten], "LECTOTYPE/ *Philonome/ albella* (Chambers)/ by J. C. SOHN 2009" [red label with black line borders]. Paralectotype—1♀, Colorado, [no date].

*Current Status. Elachista dasycara* Kaila, 1999 [Elachistidae (Kaila, 1999)].

*Notes.* Miller and Hodges (1990) mentioned the presence of two possible syntypes of *Eurynome albella* from the LACM collection.

***alniella*** Chambers, 1875b: 303 (*Lyonetia*).

*Type Locality.* Colorado, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 12)—♂, "Col[orado]", "Kentucky [with a single strike-through (incorrect locality)]/ Chambers", "Type/ 1313" [red label with white top], "LECTOTYPE [in red] ♂/ *Lyonetia* | *alniella* Ch./ By D. Davis" [label with black line borders], "Photograph/ on file/ USNM" [label with blue line borders], hindlegs in a gelatin capsule attached with the specimen. Paralectotypes—3♂, 3♀, 1 ex., Colorado, [no date].

*Current Status. Lyonetia alniella* Chambers, 1875 [Lyonetiidae].

*Notes.* Chambers (1875b) wrote that he collected the specimens of *Lyonetia alniella* "along Grand River, Clear Creek, Fall River and Fountain-qui-Bouille." It is impossible to decide which of the places each type specimen of *L. alniella* came from, as the labels indicate only "Colorado" for the locality. The original description also included no statement about how many type specimens were designated for *L. alniella*. Miller and Hodges (1990) located nine syntypes of *L. alniella* from MCZ and another syntype from LACM. A male specimen from the MCZ collection has been designated as the lectotype of *L. alniella* by Donald Davis, as indicated by label data. This designation, however, has not been published. The same specimen is designated as the lectotype of *L. alniella* here. The type series includes specimens of at least three types of forewing patterns probably due to polymorphism. However, one male paralectotype is not conspecific, but a coleophorid.

***altissimella*** Chambers, 1877: 130, 147 (*Argyresthia*).

*Type Locality.* Mount Elbert, Colorado, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 2)—♂, "Chambers/ Colorado", "Type/ 1412" [red label with white top], "*Argyresthia/ altissimella*" [handwritten], "LECTOTYPE [in red]/ *Argyresthia/ altissimella* C./ By J. SOHN 2009" [label with black double-line margins], "Genitalia slide/ MCZ-L107 ♂/ Prep. By JC Sohn" [label with black line borders].

*Current Status. Argyresthia altissimella* Chambers, 1977 [Argyresthiidae].

*Notes.* Chambers (1877) did not give the number of the type specimens in his description of *A. altissimella*. A male specimen from the MCZ collection is the only extant syntype of the species and thus it is designated as the lectotype of *A. altissimella*.

***apicistrigella*** Chambers, 1875a: 105 (*Lyonetia*).

*Type Locality.* Kentucky, U.S.A.

*Type Series (designated by Schmitt* et al., *1996).* Lectotype (Fig. 13)—♀, "Kentucky/ Chambers", "Type/ 1314" [red label with white top], "Cham./ K[entuck]y" [handwriting]. "*Lyonetia/ apicistrigella*" [handwritten], "Lectotype [in red] ♀/ *Lyonetia apicistrigella* Ch./ By D, Davis" [label with black line borders], "Photograph/ on file/ USNM" [label with blue line borders], abdomen missing.

*Current Status. Lyonetia prunifoliella* (Hübner, 1796), synonymized by Schmitt *et al.* (1996) [Lyonetiidae].

*Notes.* The number of the type specimens for *Lyonetia apicistrigella* was given ambiguously by Chambers (1875a): evidently, he

based the species description on one specimen, but then went on to comment on another specimen that he thought conspecific with *L. apicistrigella*. It is unclear from his treatment whether or not he intended the second specimen to be part of the type series of *L. apicistrigella*. Given the uncertainty, Miller and Hodges (1990) regarded the type series of *L. apicistrigella* to include two syntypes. There exists only one specimen of *L. apicistrigella* holding the MCZ type label in the MCZ collection. This specimen was designated as the lectotype of *L. apistrigella* by Schmitt *et al.* (1996), who erroneously gave its sex as male.

***austerella*** Zeller, 1873: 305 (*Argyresthia*).

*Type Locality.* Dallas, Texas, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 3)—♂, "Dallas/ Tex[as] Boll", "Type/ 14254" [red label], "*Argyresthia*/ *austerella* Z./ cotype [handwritten on green label]", "Zeller", "LECTOTYPE/ *Argyresthia*/ *austerella*/ by J.C. SOHN 2009" [red label with black line borders], "Genitalia slide/ MCZ-L105 ♂/ Prep. By JC Sohn". Paralectotypes—1♂, 1♀, Dallas, Texas, [no date], Zeller.

*Current Status. Argyresthis austerella* Zeller, 1873 [Argyresthiidae].

***belangerella*** Chambers, 1875d: 145 (*Argyresthia*).

*Type Locality.* Canada.

*Type Series (designated here).* Lectotype (Fig. 4)—♂, "Chambers./ Canada", "Type/ 1407" [red label with white top], "48" [green label], "*Belangerella*/ Cham" [handwritten with red ink], "Genitalia slide/ MCZ-L108 ♂/ Prep. By JC Sohn" [label with black line borders], "LECTOTYPE [in red]/ *Argyresthia*/ *belangerella* Ch./ By J. SOHN 2012" [label with black double-line margins], right fore- and hindwing missing.

*Current Status. Argyresthia belangerella* Chambers, 1875 [Argyresthiidae].

*Notes.* Chambers (1875d) did not state the number of specimens in the type series of *Argyresthia belangerella*. Busck (1907) found two syntypes of *A. belangerella*, one deposited in USNM and the other in MCZ. The USNM's syntype is missing (Sohn and Lewis, 2012), and thus the lectotype of *A. belangerella* is designated from the MCZ collection.

***canariella*** Walsingham, 1881: 309, pl. 35: 11 (*Cerostoma*).

*Type Locality.* Scott's Valley, California, U.S.A.

*Type Series (designated here).* Paralectotype—2♂, [locality not stated; probably same as lectotype: Scott's Valley, California]. Lectotype in BMNH.

*Current Status. Ypsolopha canariella* (Walsingham, 1881) [Ypsolophidae].

*Notes.* Walsingham (1881) indicated that his description of *canariella* is based on several specimens, but he did not give the exact number. It is likely that he left only one type specimen of the species in the BMNH and distributed all others to unknown colleagues and collections. The BMNH specimen has been erroneously regarded as the holotype of *canariella*. The type series of *canariella* is corrected here with the remaining specimen in the BMNH designated as the lectotype: male, "Scott's Valley/ Lake Co./ CALIFORNIA/ 17-19. VI. 1871/ Wlsm.", "Walsingham/ Collection./ 1910-427.", "no236/ found 1/ wlsm" [handwritten], "*CEROSTOMA*/ *CANARIELLA*/ Wlsm. P.Z.S.1881/ 309.PL. XXXV.11/ TYPE ♂" [handwritten].

***castella*** Walsingham, 1881: 310, pl. 35: 13 (*Euceratia*).

*Type Locality.* Russian River, Sonoma Co., California, U.S.A.

*Type Series (designated here).* Paralectotype—1♂, 1♀, San Francisco, California. Lectotype in BMNH.

*Current Status. Euceratia castella* Walsingham, 1881 [Ypsolophidae].

*Notes.* Walsingham (1881) mentioned that he used "several specimens" collected from near San Francisco and Mount Shasta for the description of *castella*. The description of this species is therefore based on syntypes. A male from the BMNH has been erroneously regarded as holotype. Given its fair condition, the same specimen is designated here as lectotype and the labels read: "Russian R[iver]/ Sonoma Co./ CALIFORNIA/ 19.V. 1871/ Wlsm", "Walsingham/ Collection./ 1910-427", and "NG *Euceratia*/ *castella* Wlsm/ TYPE". Differing from the label data, the collecting locality is given as "near San Francisco" in the original description. Two specimens of the species from the MCZ collection are designated as paralectotypes.

***celastrusella*** Kearfott, 1903: 150, pl. 9: 1 (*Zelleria*).

*Type Locality.* Essex Co., New Jersey, U.S.A.

*Type Series (according to lectotypy by Solm and Lewis, 2012).* Paralectotypes—1♂, Essex Co., New Jersey, June 17 [year not stated], W. D. Kearfott; 1♀, Caldwell, New Jersey, May 23 [year not stated], W. D. Kearfott. Lectotype in USNM.

*Current Status. Zelleria celastrusella* Kearfott, 1903 [Yponomeutidae].

*Notes.* Kearfott (1903) described this species based on ca. 200 bred specimens that are now housed in the USNM, AMNH, BMNH, ANSP, and perhaps other still unknown collections. The presence of two syntypes of *celastrusella* from MCZ was not mentioned in the original description.

***chiococcella*** Busck, 1900: 240, pl. 1: 12 (*Podiasa*).

*Type Locality.* Palm Beach, Florida, U.S.A.

*Type Series (according to lectotypy by Solm and Lewis, 2012).* Paralectotype—1♂, Palm Beach, Florida, March 17, 1900 [reared], Type no. 1618; 1♂, ditto, Type no. 14227. Lectotype in USNM.

*Current Status. Podiasa chionoccella* Busck, 1900 [putative Plutellidae].

***clemensella*** Chambers, 1874: 97 (*Philonome*)

*Type Locality.* Kentucky, U.S.A.

*Type Series.* Syntypes—4♀, 3 ex., Kentucky, June 14 [no year], Chambers, Type no. 1311.

*Current Status. Philonome clemensella* Chambers, 1874 [putative Lyonetiidae].

***deletella*** Zeller, 1873: 305 (*Argyresthia*).

*Type Locality.* Dallas, Texas, U.S.A.

*Type Series (designated here).* Paralectotypes—2♂, 1♀, Dallas, Texas, [no date], genitalia slide no. MCZ-L109 (♂). Lectotype in BMNH.

*Current Status. Argyresthia deletella* Zeller, 1873 [Argyresthiidae].

*Notes.* Zeller (1873) did not give the number of specimens in the type series of *Argyresthia deletella* but did refer to the presence of both sexes in his description. A total of five syntypes of the species have been found in the BMNH and the MCZ. A male specimen from the BMNH is designated as lectotype and all others as paralectotypes. The lectotype labels state: "Dallas/ Tex[as] Boll", "Zeller Coll./ Walsingham/ Collection./ 1910-427.", "*Argyresthia*/ *deletella* Z./ Texas Hg. 71" [handwritten on green paper], "♂" [indigo symbol on label with indigo line borders], "TYPE" [label with black line borders].

***dentiferella*** Walsingham, 1881: 308, pl. 35: 10 (*Cerostoma*).

*Type Locality.* Mt. Shasta, California, U.S.A.

*Type Series (designated here).* Paralectotypes—1♂, 1 ex., [Mt. Shasta], California. Lectotype in BMNM.

*Current Status. Ypsolopha dentiferella* (Walsingham, 1881) [Ypsolophidae].

*Notes.* Walsingham (1881) did not indicate how many specimens he used for the description of *dentiferella* and where those were

deposited. Since only one type of the species is present in the BMNH, it has been mistakenly considered the holotype. I hereby designate lectotype of *dentiferella* with the specimen from the BMNH: male, "Mt. Shasta/ Siskiyou Co./ CALIFORNIA/ 2.VIII-1.IX.1871/ Wlsm.", "Walsingham/ Collection./ 1910-427.", "no475/ found 5/9/ wlsm" [handwritten], "*CEROSTOMA/ DENTIFERELLA/* Wlsm. P.Z.S. 1881/ 308-9. Pl.XXXV.10/ TYPE ♂" [handwritten].

***falciferella*** Walsingham, 1881: 307, pl. 35: 7 (*Cerostoma*).

*Type Locality.* Mt. Shasta, California, U.S.A.

*Type Series (designated here).* Paralectotype—1♂, California and Oregon [not specified]. Lectotype in BMNH.

*Current Status. Ypsolopha falciferella* (Walsingham, 1881) [Ypsolophidae].

*Notes.* This species was described from 12 specimens collected from California and Oregon. Like other *Ypsolopha* described by Walsingham, the type specimens probably were distributed to other collections and correspondents. One type specimen extant in the BMNH has been erroneously regarded as the holotype of *falciferella*, which is actually a syntype. Another syntype has been found in the MCZ collection. The BMNH specimen is designated as the lectotype of *falciferella*: male, "Mt. Shasta/ Siskiyou Co./ CALIFORNIA/ 2.VIII-1.IX.1871/ Wlsm.", "Walsingham/ Collection./ 1910-427", "no474/ found 5/13/ wlsm" [handwritten], "*CEROSTOMA/ FALCIFERELLA/* Wlsm. P.Z.S. 1881/ 307. Pl. XXXV.7./ TYPE ♂" [handwritten].

***frustella*** Walsingham, 1881: 309, pl. 35: 12 (*Cerostoma*).

*Type Locality.* Bear Creek, Shasta Co., California, U.S.A.

*Type Series (designated here).* Paralectotype—2♂, [Bear Creek, Shasta Co.], California. Lectotype in BMNH.

*Current Status. Ypsolopha frustella* (Walsingham, 1881) [Ypsolophidae].

*Notes.* Two specimens of *Ypsolopha frustella* from the MCZ bear the "type" label. These are likely a part of 12 syntypes that Walsingham mentioned in his description of *frustella*. There is only one type specimen (male) in the BMNH collection which has been confused as holotype. I designate the lectotype of *frustella* with the BMNH specimen; hence, the two specimens from MCZ become paralectotypes. The label of the lectotype reads: "Bear Creek/ Shasta Co./ CALIFORNIA/ 27-28. VII. 1871/ Wlsm.", "Walsingham/ Collection./ 1910-427.", "no422/ found 15/26/ wlsm" [handwritten], "*CEROSTOMA/ FRUSTELLA/* Wlm. P.Z.S. 1881/ 309-10. Pl. XXXV. 12/ TYPE ♂".

***fuscoscapulella*** Chambers, 1878: 104 (*Acanthocnemes*).

*Type Locality.* Bosque Co., Texas, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 14)—♂, "Texas.", "Type/ 1530" [red label with white top], "*fuscoscapulella*" [handwritten], "LECTOTYPE/ *Acanthocnemes/ fuscoscapulella* Cham./ by J. C. SOHN 2009" [red label with black line borders], "Genitalia slide/ MCZ-L123/ Prep. by JC Sohn" [label with black line borders]. Paralectotype—1♀, same as lectotype.

*Current Status. Acanthocnemes fuscoscapulella* Chambers, 1878 [Lyonetiidae].

*Notes.* Chambers (1878) did not state the number of specimens in the type series of *Acanthocnemes fuscoscapulella*. The series of the species in the MCZ comprises two individuals, one pinned and the other glued on a paper. Both insects have been severely damaged to the extent that it is difficult to tell if they are conspecific. Considering their size differences, it is more likely that they represent two species. These two individuals have been separated and the pinned specimen which better corresponds to the original description is designated as the lectotype of *A. fuscoscapulella*.

***inornatella*** Chambers, 1880: 188 (*Eulyonetia*).

*Type Locality.* Belfrage, Texas, U.S.A.

*Type Series.* Holotype (not found).

*Current Status. Eulyonetia inornatella* Chambers, 1880 [Lyonetiidae].

*Notes.* The type specimen of *Eulyonetia inornatella* Chambers was listed by Miller and Hodges (1990). This specimen could not be found during my inventory in the MCZ. Chambers (1880) stated that he described the genus *Eulyonetia* based on a single specimen. Miller and Hodges (1990) erroneously stated the type status of *E. inornatella* to be syntypes.

***luteella*** Chambers, 1875b: 304 (*Eurynome*).

*Type Locality.* Spanish Bar, Colorado, U.S.A.

*Type Series.* Holotype (Fig. 15)—♀, "Kentucky with a double strike-through (incorrect locality)]/ Chambers", "Type/ 14964" [red label], "♀ genitalia on/ slide 4502/ D.R. Davis" [on a label with black border line], "*Eurynome luteella* Chambers" [handwritten on folded paper], "♀genitalia on/ slide 4502/ D.R.Davis" [label with black line borders], "Genitalia slide/ MCZ-L122/ Prep. by JC Sohn" [label with black line borders].

*Current Status. Philonome luteella* (Chambers, 1875) [putative Lyonetiidae].

***montella*** Chambers, 1877: 130 (*Argyresthia*).

*Type Locality.* Edgerton, Colorado, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 5)—♂, "Chambers/ Colorado", "Type/ 1411" [red label with white top], "*Argyresthia/ montella* Cham/ Colo" [handwritten], "LECTOTYPE [in red]/ *Argyresthia/ montella* C./ By J. SOHN 2009" [label with black double-line margins], "Genitalia slide/ MCZ-L102 ♂/ Prep. by JC Sohn" [label with black line borders].

*Current Status. Argyresthia montella* Chambers, 1877 [Argyresthiidae].

*Notes.* Chambers (1877) did not state the number of type specimens in his description of *Argyresthia montella*. Miller and Hodges (1990) reported a type specimen of *A. montella* in the MCZ collection to be one of the syntypes. This specimen is designated as the lectotype of *A. montella*.

***ochrella*** Chambers, 1880: 181 (*Pluteloptera*).

*Type Locality.* Texas, U.S.A.

*Type Series.* Holotype (Fig. 17)—♀, "Chambers/ Kentucky [with a single strike-through (incorrect locality)]", "Type/ 1414" [a red label with white top], "24/3." [handwritten], "Plutellaroptera [sic]/ Ochrella, Cham. Texas" [handwritten], both right wings removed, possibly for wing slide preparation [not traced].

*Current Status. Ypsolopha ochrella* (Chambers, 1880) **stat. rev.**, a senior synonym of *Ypsolopha rubrella* (Dyar, 1902) **syn. nov.** [Ypsolophidae].

*Notes.* Chambers (1880) stated that his description of the monotypic *Pluteloptera* was based on a single specimen. This specimen is still extant in the MCZ collection. Miller and Hodges (1990) erroneously treated it to be a syntype of *Pluteloptera ochrella*. This species has been regarded as a junior synonym of *Ypsolopha ustella* (Clerck), ever since Walsingham (1889). This treatment, however, appears inappropriate as discussed below, where *ochrella* is proposed as a valid name and a senior synonym of *Ypsolopha rubrella*.

***pedmontella*** Chambers, 1877: 131 (*Argyresthia*).

*Type Locality.* Edgerton, Colorado, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 6)—♀, "Chambers/ Colorado", "Type/ 1409" [red label with white top], "*Argyresthia/ pedmontella/* Cham Colo" [handwritten], "LECTOTYPE/ *Argyresthia/ pedmontella* Cham./ by J.C. Sohn 2009" [red label with black line borders], "Genitalia slide/ MCZ-L106 ♀/ Prep. by JC Sohn" [label with

black line borders]. Paralectotype—1♀, Colorado, [no date].

*Current Status. Argyresthia pedmontella* Chambers, 1877 [Argyresthiidae].

***polita*** Walsingham, 1881: 302, pl. 35: 2 (*Calantica*).

*Type Locality.* Lake Co., California, U.S.A.

*Type Series (designated by Solis and Nishida, 2011).* Paralectotypes—2♂, [Lake Co.], California. Lectotype in BMNH.

*Current Status. Eucalantica polita* (Walsingham, 1881) [Yponomeutidae].

***quadristrigella*** Zeller, 1873: 304 (*Argyresthia*).

*Type Locality.* Dallas, Texas, U.S.A.

*Type Series.* Holotype (Fig. 7)—♂, "Dallas, Tex[as] Boll", "HOLOTYPE/ *Argyresthia quadristrigella* Z." [red label].

*Current Status. Argyresthia quadristrigella* Zeller, 1873 [Argyresthiidae].

***quercicolella*** Chambers, 1877: 130 (*Argyresthia*).

*Type Locality.* Edgerton, Colorado, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 8)—♂, "Chambers/ Colorado", "Type/ 1410" [red label with white top], "*Argyresthia/ quercicolella*" [handwritten], "LECTOTYPE/ *Argyresthia/ quercicolella* Cham./ by J.C. SOHN 2009" [red label with black line borders], "Genitalia slide/ MCZ-L101 ♂/ Prep. by JC Sohn" [label with black line borders]. Paralectotype—1♂, Colorado, [no date].

*Current Status. Argyresthia quercicolella* Chambers, 1877 [Argyresthiidae].

***securella*** Walsingham, 1881: 311, pl. 35: 14 (*Euceratia*).

*Type Locality.* Dry Creek, Mendocino Co., California, U.S.A.

*Type Series (designated here).* Paralectotype—1♂, Sonoma. Lectotype in BMNH.

*Current Status. Euceratia securella* Walsingham, 1881 [Ypsolophidae].

*Notes.* The original description of *Euceratia securella* stated the presence of 17 specimens in the type series. These specimens have been scattered to other collections and correspondents. There exists a single male type specimen of *E. securella* in the BMNH collection which has been confused as the holotype. To avoid further confusion, the BMNH specimen (in fair condition) is designated as the lectotype of *E. securella.* The label reads: "head of Dry Creek/ Mendocino Co./ CALIFORNIA/ 24.V. 1871/ Wlsm", "Walsingham/ Collection./ 1910-427", "*Euceratia/ securella* Wlsm/ TYPE Cala". In the original description, "Sonoma County" was given as the type locality of *securella.* The collecting locality on the lectotype label is, however, given as Mendocino County. This discrepancy may be due to a correction of the collecting data or simply Walsingham's confusion on two adjacent counties of which boundaries were poorly known in the 1870s. The collecting site on the type label is accepted as the type locality of *E. securella.*

***subfasciella*** Walsingham, 1881: 303 (*Araeolepia*).

*Type Locality.* Currant Creek, Oregon, U.S.A.

*Type Series (according to Heppner, 1978).* Paralectotype—1♂, N[orth] Oregon, [no date], Type no. 14986. Lectotype in BMNH.

*Current Status. Araeolepia subfasciella* Walsingham, 1881 [Superfamily incertae sedis].

***thuiella*** Packard, 1871: 24 (*Bucculatrix*).

*Type Locality.* Brunswick, Maine, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 9)—♀, "Cedar/ July 8 [larvae]/ July 25 [emergence]" [handwritten], "Type/ 14963" [red label], "*B. thuiella* * Pack[ard]/ fr[om] Cedar./ M[ain]e" [label with black line borders]. Paralectotypes—1♂, 1♀, same as lectotype.

*Current Status. Argyresthia thuiella* (Packard, 1871) [Argyresthiidae].

TABLE 1. COMPARISON OF THE EXTERNAL AND GENITAL FEATURES BETWEEN *YPSOLOPHA OCHRELLA* AND *Y. USTELLA*.

| Characters | *Y. ochrella* | *Y. ustella* |
|---|---|---|
| External appearances | | |
| Antennae: Scape and dorsobasal 1/3 of flagella | white | yellowish brown |
| Forewing: discal spot | at middle of posterior margin of discal cell | at lower angle of posterior margin of discal cell |
| Forewing: dark brown, longitudinal line | always absent | sometimes present |
| Genitalia | | |
| Costa of valva (♂) | angulate medially | smoothly arched |
| Small dentiform projection at apex of valva (♂) | absent | present |
| Posterolateral projections of vinculum (♂) | absent | present |
| Saccus (♂) | slender, as long as uncus | slightly broad, shorter than uncus |
| Needle-like cornuti (♂) | longer than coecum | shorter than coecum |
| Ductus ejaculatorius (♂) | sclerotized and strongly curved basally | not sclerotized and curved basally |
| Ductus bursae after antrum (♀) | nearly even width | broadened to corpus bursae |
| Ductus bursae (♀) | as broad as or broader than antrum | narrower than antrum |
| Granulation on ductus bursae (♀) | only near antrum | nearly entire area after antrum |
| Transverse ridge of signum (♀) | one | two |

*Notes.* The three type specimens from the MCZ collection are unspread and stored in a glass vial with host plant remains.

***undulatella*** Chambers, 1874: 10 (*Argyresthia*).

*Type Locality.* Kentucky, U.S.A.

*Type Series (designated here).* Lectotype (Fig. 10)—♂, "Kentucky", "Peab. Acad.", "Type/ 1408" [red label with white top], "30" [handwritten], "*undulatella*" [handwritten], "Lectotype/ *Argyresthia*/ *undulatella*/ by J.C. SOHN 2009" [red label with black line borders], "Genitalia slide/ MCZ-L103/ Prep. By JC Sohn" [label with black line borders]. Paralectotypes—2♂, 1♀, 2 ex., Kentucky, Chambers, Type no. 1408, genitalia slide no. MCZ-L104 (♂).

*Current Status. Argyresthia undulatella* Chambers, 1874 [Argyresthiidae].

*Notes.* Chambers (1874) did not state the number of specimens in the type series of *Argyresthia undulatella*. There exist seven syntypes in the MCZ and USNM collections.

***vanella*** Walsingham, 1881: 305, pl. 35: 6 (*Plutella*).

*Type Locality.* Russian River, Sonoma Co., California, U.S.A.

*Type Series (designated here).* Paralectotype—1♂, San Francisco, California. Lectotype in BMNH.

*Current Status.* '*Plutella*' *vanella* Walsingham, 1881 [Plutellidae].

*Notes.* Walsingham (1881) gave no details of the type series for *Plutella vanella*. In the original description, he mentioned three localities: near San Francisco, Lake Co., and Shasta Co. Therefore, the type series of *P. vanella* originally was based on multiple specimens. In the BMNH collection, only a single male of those types is still extant and the label reads "Russian R[iver]/ Sonoma Co./ CALIFORNIA/ 19. V. 1871/ W[a]ls[ingha]m". This specimen has been inappropriately regarded as the holotype of *P. vanella*. Given its fair condition, the specimen is

designated as the lectotype of *P. vanella*; hence, one type specimen from the MCZ collection becomes a paralectotype.

### Invalidated types

***bella*** Chambers, 1875c: 73 (*Aetole*).

*Notes.* One specimen bearing a label, "Type 1364," in the MCZ collection had been regarded as a syntype of *Aetole bella*. Hsu and Powell (2005) found that the type specimen did not correspond to the original description and actually was a misidentification of *Aetole tripunctella* Walsingham. Since the misidentified syntype is the only extant type specimen of *A. bella*, Hsu and Powell (2005) designated a neotype for the species which is deposited in USNM.

***querciella*** Busck, 1903: 55 (*Abebaea*).

*Notes.* Busck (1903) did not include the specimen from the MCZ in his designation of the type series of *querciella*, nor did he mention the existence of cotypes. Since the label data is the only source indicating "cotype," its type status is invalidated.

***smilaciella*** Busck, 1900: 244, pl. 9: 6 (*Leucoptera*).

*Notes.* A specimen of *Proleucoptera smilaciella* from the MCZ collection bears a label stating "Type 14250." The type number, however, does not agree with the original description. Busck (1900) did not include the MCZ for a type depository of *P. smilaciella*, and Miller and Hodges (1990) also did not list the specimen.

## REVISED IDENTITY OF *PLUTELOPTERA OCHRELLA* CHAMBERS

*Ypsolopha ochrella* (Chambers) **stat. nov.**

Figures 17–22, 27, 28, 30, 31, 33

*Pluteloptera ochrella* Chambers, 1880: 181 (Type locality: Texas, U.S.A. [MCZ]).

*Cerostoma radiatella* (nec Donovan, 1794); Walsingham, 1889: 287 [misidentification].

*Cerostoma rubrella* Dyar, 1902: 404 (Type locality: Colorado, U.S.A. [USNM]). **syn. nov.**

*Ypsolophus ochrella*; Moriuti, 1964: 197.

*Ypsolopha ochrella*; Moriuti, 1977: 73.

*Types.* Holotype of *ochrella* (Fig. 17)—female, Kentucky [with a single strike-through (incorrect locality)] MCZ.

Lectotype of *rubrella* (designated here; Fig. 18)—female, "Type/ No. 6763/ U.S.N.M." [a red label], "CO: Summit Co./ Boulder Creek Canyon/ 8 vi 1901 on *Berberis*/ *repens*, HG Dyar" [handwritten], "Dyar &/ Caudell", "16589", "LECTOTYPE/ *Cerostoma* ♀/ *rubrella* Dyar/ By J. SOHN 2013". Paralectotypes of *rubrella*—1♂, same locality as lectotype, 9 VI 1901 (Dyar and Caudell), on *Berberis repens*, "16600", USNM Genitalia Slide No. 124311 [with female genitalia]; 2♀ [on same mounting strip], same locality as lectotype, 10 VI 1901 (Dyar and Caudell), on *Berberis repens*, "16633", USNM Genitalia Slide No. 115096; 2♂ (on same mounting strip), same locality as lectotype, 11 VI 1901 (Dyar and Caudell), on *Berberis repens*, "16649", "16650", and "16651"; 1♀, same locality as lectotype, 13 VI 1901 (Dyar and Caudell), on *Berberis repens*, "16724", USNM Genitalia Slide No. 124311 [with male genitalia], USNM Wing Slide No. 124312 (♀). All specimens deposited in USNM.

*Redescription (based on type specimens of* ochrella *and* rubrella*).* Head—Vertex pale orange or reddish brown; frons dark brown, sparsely intermixed with white scales medially. Antenna 1/2 as long as forewing; scape white, pale brown anteriorly, with narrow, dark brown, longitudinal streak posteriorly; first six flagellomeres white, with narrow dark brown, longitudinal streak laterally; remaining flagellomeres white over basal 2/3, dark brown distal 1/3. Labial palpi upcurved; first segment dark brown dorsally, white ventrally; second segment 2× longer than first, dark brown, with white scale tufts

ventrally; third segment as long as second, dark brown, peppered with pale gray, acuminate apically.

Thorax—Patagium, tegula, and mesonotum grayish brown or purplish brown. Foreleg with coxa to femur white, sparsely peppered with dark brown; tibia and tarsomeres dark grayish brown, peppered with white. Midleg with coxa and femur white, intermixed with dark brown scales; tibia and tarsomere I dark brown, sparsely peppered with white dorsally, white ventrally; remaining tarsomeres dark brown, peppered with white. Hindleg with coxa and femur white, sparsely peppered with dark brownish gray; tibia silvery white, tinged with pale brown dorsally; tarsi white, speckled with dark grayish brown. Forewing length 7.2–9.2 mm ($n = 8$), purplish orange (*ochrella*) or purplish brown (*rubrella*), sparsely peppered with dark brown scales, sometimes with pale purplish brown streak along CuP fold; dark brown spot either above middle of CuP fold or at middle of posterior margin of discal cell or both; fringe pale orange or fringe pale purplish brown. Hindwing dark brownish gray; fringe yellowish gray.

Male genitalia—Uncus rectangular; socius slender, falcate, setose dorsally, as long as saccus. Tegumen subquadrate, with W-configuration dorsoanteriorly; gnathos 1.5× longer than socius, with linguiform, thorny medial lobe. Valva elongate, obovate, costa convex at basal 3/5, setose; sacculus sparsely setose, broadened to base. Anellus 3/4 as long as saccus, with dense thorns on posterior half. Vinculum quadrate; saccus slender, slightly broadened apically. Phallus curved, narrowed posteriorly; ductus ejaculatorius sclerotized basally; a pair of narrow cornutal zones spinulate in posterior 1/3, needle-like in anterior 2/3.

Female genitalia—Papillae anales subtriangular, setose. Abdomen IX sclerotized, with pair of setal areas posteroventrally, sparsely setose posterodorsally. Intersegmental membrane between papillae anales and abdomen IX 4/5 as long as apophyses anteriores. Apophyses posteriores 1.5× longer than apophyses anteriores; apophyses anteriores with Y fork basally, ventral branches connected with each other along anteroventral margin of abdomen VIII. Ductus bursae of even width after antrum, constricted around antrum, broadened to corpus bursae before antrum; antrum bowl-shaped, accompanied with granulated area posteriorly and anteriorly. Corpus bursae oval, 1/2 as long as ductus bursae; signum obovate, with transverse bulge medially.

*Distribution.* Canada (British Columbia) and U.S.A. (Arizona, California, Colorado, Nevada, New Mexico, Oklahoma, Texas).

*Host Plant.* Berberidaceae—*Mahonia repens* (Lindl.) G. Don (= *Berberis repens*).

*Remarks.* Chambers (1880) originally thought that *Pluteloptera ochrella* was allied with *Plutella* (Plutellidae). Walsingham (1889) reviewed Chambers' description of the species and found that *P. ochrella* agreed more with *Ypsolopha*. He also mentioned that he had examined a Texan specimen supposedly conspecific with Chambers' *ochrella* which was also described from Texas. He compared the specimen with *Cerostoma radiatella* (Donovan), now *Ypsolopha ustella* (Clerck), from California and Europe, and proposed *Pluteloptera ochrella* to be a synonym of *Cerostoma radiatella* based on superficial similarity. My examination of the type specimen of *P. ochrella* and the European specimens of *Y. ustella* (Figs. 23–26, 29, 32, 34) reveals that they are two separate species (Table 1). Furthermore, there are no confirmed records of *Y. ustella* from California (Powell et al, 1998), thus questioning the presence of the species in the North America. Walsingham's synonymy of those two species is regarded to be in error.

Among the species of *Ypsolopha* from North America, *ochrella* is very similar to *Y. rubrella* (Busck) which was described from

Colorado. In superficial appearance, *Ypsolopha rubrella* is more reddish than *P. ochrella*, as indicated by their specific epithets (the Latin *rubri* = "red" vs. the Greek *ochro* = "pale yellow"). However, *Ypsolopha rubrella* is known to be variable in coloration (Figs. 19–22), and some color variations converge to *P. ochrella*. The female genitalia of *ochrella* and *rubrella* show no significant differences (Figs. 27 and 28). The type specimens of both species show slight differences in the antrum of the female genitalia which are due to individual variation and different genital preparations (Figs. 30a, b). Therefore, *Ypsolopha rubrella* is proposed here as a junior synonym of *Pluteloptera ochrella*. This change entails a resurrection of *Pluteloptera ochrella* as a valid name according to the Code (ICZN, 1999).

## ACKNOWLEDGMENTS

I thank Donald Davis (USNM) and David Wagner (University of Connecticut) for critically editing my manuscript. I am also grateful to Naomi Pierce (MCZ), Philip Perkins (MCZ), and Kevin Tuck (BMNH) for facilitating my examination of the museum specimens under their care and to Jon Lewis (retired, USNM) and Jean-François Landry (Agriculture and Agri-Food Canada, Ottawa) for their assistance in clarifying issues involved in Chambers' original descriptions. My visit to MCZ and BMNH was supported by the Ernst Mayr Grant (2008) and the NSF-funded Lepidoptera Tree of Life Project (award numbers 0531626 and 0531769), respectively.

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